Dissecting Missouri's Digital Divide

A study of residential broadband adoption and availability in the State of Missouri

June 2012

The first in a series of *MoBroadbandNow* reports addressing the broadband challenges in Missouri.

About MoBroadbandNow

MoBroadbandNow was established by Gov. Jeremiah W. (Jay) Nixon in 2009 as a public-private partnership initiative to expand and enhance broadband accessibility and adoption. Gov. Nixon aggressively pursued support from various sources including the Broadband Technology Opportunity Program (BTOP), Rural Utilities Service (RUS) and the American Recovery and Reinvestment Act (ARRA). He regards broadband adoption fundamental to Missouri's future and global competitiveness, in much the same way as the railroad and the interstate highway system were to their historic periods. Gov. Nixon has set an ambitious goal to increase the number of Missourians with broadband accessibility from the initial level of 79 percent to at least 95 percent by the end of 2014.

The initiative's first effort was partnering with broadband providers to identify communities that were underserved or unserved with high-speed Internet within the state. Through a competitive award process, funding was secured to design and build a new broadband infrastructure. Missouri broadband providers were awarded $261 million for 19 projects; including additional cash and in-kind support, this investment total is nearly $320 million.

Missourians have already begun reaping the benefits of improved high-speed Internet. In May 2011, Ralls County Electric Cooperative was one of the first ARRA-awarded providers to substantially complete construction and offer service to homes and businesses. Other *MoBroadbandNow*-endorsed projects are underway and as a result, more citizens will see faster, reliable connections in the future.

MoBroadbandNow is a state-led collaboration with the University of Missouri and private sector partners GeoDecisions and CBG Communications, Inc.

The initiative undertaken has seven core objectives:

1. Collecting and verifying data and information;
2. Preparing comprehensive state and regional broadband maps;
3. Establishing regional technology planning teams;
4. Building new and leveraging existing relationships with broadband stakeholders;
5. Providing technical assistance;
6. Tracking the progress of infrastructure projects and providing transparency; and
7. Convening public forums and community outreach.

The University of Missouri team has produced a series of state and regional maps identifying population density, the number of broadband providers and service coverage, average download speed and topography. Currently, there are more than 100 Internet Service Providers (ISPs) participating in these data submissions.

Missouri has approached broadband planning from a regional perspective in that each of the 19 regional planning teams within the state is developing its own Broadband Strategic Plan. A

comprehensive broadband needs assessment was conducted in 2011 by collecting residential and business data on accessibility, adoption, affordability, speed and usage. This report is the first in a series of reports to be released addressing the findings in the broadband assessment.

Executive Summary

To facilitate high-speed Internet (broadband) adoption and availability in Missouri, an unprecedented residential assessment was conducted in 2011. More than 76,400 randomly sampled households were provided an opportunity to share their broadband experience. Thirteen percent (13% or 9,825) of the residents responded. This effort represents one of the largest statistical samples on state broadband trends in the country and provides Missouri a robust snapshot of residential Internet access and use. Data and information obtained through the needs assessment is being used to create a series of published reports on specific broadband topics. This report is the first in the series.

Key Highlights

- ✓ Overall, 88% of Missouri residents report having Internet service at home. Of these, 71% have a broadband connection with an average monthly Internet service cost of $43.

- ✓ When considering Missouri's rural residents, 88% also have Internet service at home, but of these, only 63% have a broadband connection. This is compared to 82% of non-rural residents with broadband--a difference of 19%.

- ✓ Sixteen percent (16%) of Missouri's rural residents remain on a dial-up Internet connection 20 years after the public launch of the Internet.

- ✓ Rural residents are twice as likely to be dissatisfied with the speed of their Internet connection (40% v. 20%) than urban residents. This is closely followed by greater rural dissatisfaction with the number of Internet providers available (60% v. 45%).

- ✓ When Missouri's rural residents go online they are more likely than non-rural residents to take a class, operate a home-based business, look for information about a job or product to buy, and more likely to visit their state, region or local government website.

- ✓ DSL is the primary provider of broadband in Missouri, providing 44% of residents their broadband connection.

- ✓ Rural residents in lower-income households are more willing to spend a portion of their income on broadband service--signaling its importance to rural citizens.

- ✓ Six regions in the state still have more than 1/3 of their households that have adopted the Internet, but do not have broadband. These regions are Mark Twain, Meramec,

South Central Ozark, Ozark Foothills and Kaysinger Basin. The most critical region is Lake of the Ozarks where 52% of households that have adopted the Internet do not have a broadband connection.

The following report details the findings and challenges related to broadband availability and adoption discovered from this statewide survey. The *MoBroadbandNow* initiative is using this information to strategically close the gap on broadband availability and adoption by 2014. This work is a key cornerstone to ensuring Missouri's economic and educational vibrancy from a local, national and global perspective.

Digital Divide: Foreword and Background

When the World Wide Web and the Internet became a household word in October 1993, no one could have imagined how it would transform our world. The ability to move information is now the driver for much of the world's economic, educational, political and social systems. A robust future for Missouri will be, in part, dependent on how efficiently our citizens can participate in a digitally driven world.

The *digital divide* represents the disparity faced by Missouri's rural and urban residents in Internet availability and adoption. Confounded by other demographics, such as income, age and difficult geographic terrains, the rural-urban digital divide is the focus of this first report in a series being produced by the *MoBroadbandNow* office. Only through identifying and addressing these issues can we provide equality in the opportunities and benefits that high-speed Internet access can present to Missourians. In doing so *MoBroadbandNow* works to ensure the future vibrancy of our state.

National studies report a widening *digital divide* in the adoption of broadband technology between metro counties and non-metro counties in the United States. The rural-urban gap increased from 3 percent in 2001 to 20 percent in 2009, even though the level of adoption in both rural and urban America has increased considerably (Horrigan, 2009). This gap limits the opportunities available to rural residents, making them less competitive as compared to urban residents.

Overall, Missouri currently ranks **37th among the 50 states** in terms of broadband accessibility. The 2010 census found that Missouri has a household broadband adoption rate of 64 percent with adoption rates of 49 percent in rural areas and 69 percent in urban areas (U.S. Census Bureau, 2010).

This report presents the rural-urban disparity in computer, Internet and broadband adoption in Missouri and further analyzes how the disparity in rate of adoption varies across different household characteristics. The variation in adoption across the 19 regional planning zones of the states also is presented.

Defining "Rural": Implications on Reporting Internet Adoption

Before launching into the report, it would be helpful to clarify the use of the word "rural" as presented in this study. Numerous definitions of "rural" are used in public policy and research in the United States. The most common rural-urban distinction is based on federal comparisons of non-metropolitan and metropolitan counties as classified by the Office of Management and Budget (OMB). That definition is used as a comparison in this report; however, we also asked residents of Missouri to self-report whether they live in a rural area. In many ways the respondents self-reported rural status is the most compelling since it relies on their own perception.[1]

The Missouri residential broadband survey indicates that the average residential broadband adoption rate in Missouri is 71 percent (for year 2011), slightly higher than the national average of 66 percent reported by the Pew Internet and American Life Project in 2010.

Metro counties in Missouri have a higher adoption rate of both Internet (91%) and broadband (79%) than non-metro counties with a differential of 4 percent and 12 percent, respectively (see Table 1). One caveat of using this metropolitan / non-metropolitan dichotomy is that not all the citizens in a metropolitan county actually live in the metropolitan area of that county. Imagine more rural suburbs and new developments in these counties. The same holds true in non-metropolitan counties that have clusters of housing. Using the rural and urban classification of the OMB, only 27 percent of Missouri's population in 2010 is rural. Our sample shows that 36 percent of the residents living in metro counties self-identified themselves as living in a rural area and 34 percent of the residents living in non-metro counties self-identified themselves as living in a non-rural area. There is compelling argument to report broadband adoption based on self-identified residency type. For this reason, we have used the self-identified rural and non-rural as the basis for reporting the adoption of computer, Internet and broadband in Missouri.

When the adoption rates were calculated based on self-identified residency, the adoption rates for Internet and broadband within rural Missouri was 88 percent and 63 percent, respectively. These rates are lower than the adoption rates of non-rural residents. While Internet adoption in non-rural Missouri is just one percentage point higher than rural Missouri, there is a 19 percent gap in broadband adoption; a differential that is close to the 20 percent reported at a national level by the Pew Internet and American Life Project. Use of the OMB rural / non-rural classification appears to under report the broadband digital divide by 7 percent as compared to the rural / non-rural self-identification by surveyed Missouri residents.

In terms of broadband adoption for Missourians with a computer, only 66 percent of rural Missourians (compared to 88 percent of non-rural Missourians) have a broadband connection in their home (see Table 1).

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[1] Residents were asked in the written survey, "Do you live in a rural area?" and provided an opportunity to answer "yes" or "no."

Table 1: Digital divide based on types of residency and types of counties in Missouri

Type	Computer Ownership	Internet Adoption	Broadband Adoption*	Internet adoption among computer owners	Broadband adoption among computer owners	Broadband adoption among those who have Internet
MoBroadbandNow Residential Survey						
Self-identified rural	93%	88%	63%	92%	66%	71%
Self-identified non-rural	91%	89%	82%	96%	88%	91%
Office of Management and Budget (OMB) County Classification						
Non-metro Counties	91%	87%	67%	93%	72%	77%
Metro Counties	93%	91%	79%	95%	82%	86%
Missouri	**91%**	**88%**	**71%**	**94%**	**75%**	**80%**

(Data source: *MoBroadbandNow* - Residential Survey, 2011)
*All Internet connections that are not dial-up and satellite based on 2011 survey irrespective of the speed are considered as broadband.

Types of service and satisfaction with Internet service in rural Missouri

The majority of Missourians use DSL (44%) to provide Internet services to their home. This is true for both rural Missouri (44%) and non-rural Missouri (45%) as indicated in Table 2.

Dial-up and satellite connections together account for 28 percent of the Internet connections for rural Missourians (compared to 6 percent for non-rural Missourians) and the survey indicated that 63 percent of the rural residents who have dial-up or satellite connection choose these relatively slower connections as these were the only available connections in their area.

Table 2: Types of Internet connections among households with Internet in Missouri

Connection Type	Missouri	Rural	Non Rural
Dial-up	11%	16%	4%
Satellite	7%	12%	2%
Cable	24%	12%	39%
Cellular	4%	5%	3%
DSL	44%	44%	45%
Fixed	8%	8%	8%
Other	2%	3%	2%

(Data source: *MoBroadbandNow* – Residential Survey, 2011)

The majority of rural and non-rural residents adopted computers more than 10 years ago (61% v. 65%). However, in the last year 13% of rural residents adopted high-speed Internet service, compared to 5% of non-rural residents. This illustrates the work being done across the state by broadband providers to expand service areas and addressed unserved areas of Missouri.

Residential dissatisfaction with Internet service is higher among rural citizens of Missouri.

Rural Missourians who have Internet service are most dissatisfied with their **choice of providers** (60%) while non-rural Missourians expressed their highest dissatisfaction being the cost of Internet service (46 percent) followed by choice of providers (45%), as indicated in Figure 1.

Forty-eight percent (48%) of rural Missourians are dissatisfied with the **cost** of home Internet service, which is a slightly higher dissatisfaction level than non-rural Missourians (46%).

The most significant gap in dissatisfaction between rural and non-rural residents is with the **speed** of their Internet connection (rural 40% dissatisfied v. non-rural 20% dissatisfied). This is somewhat predictable given 28 percent of the rural Internet adopters connect via either dial-up or satellite (two of the slowest connections) compared to 6 percent of non-rural Internet adopters.
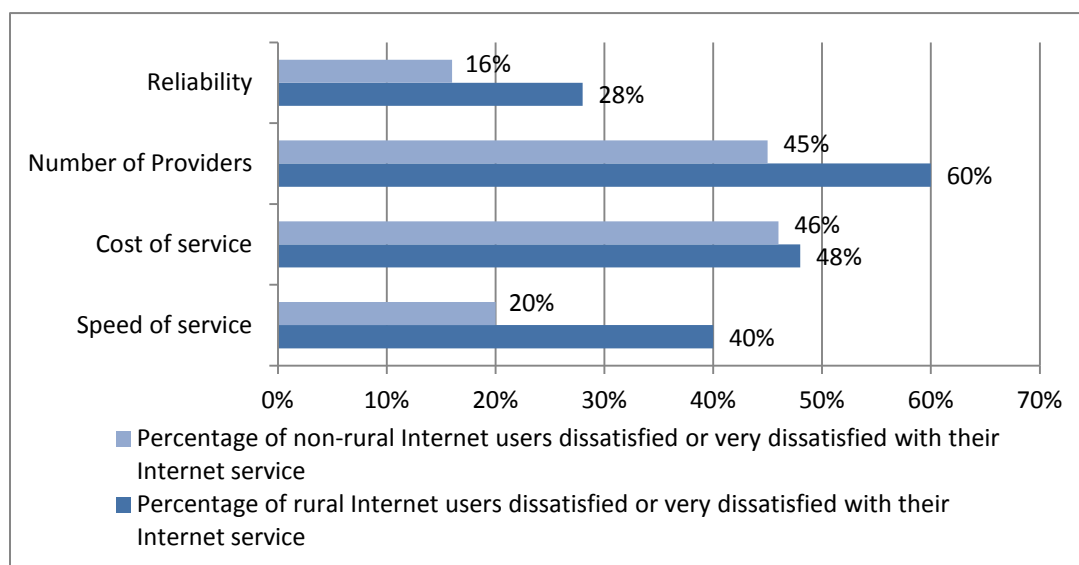

Figure 1: Comparison of the level of dissatisfaction of Internet users by type of residency
(Data source: *MoBroadbandNow* – Residential Survey, 2011)

Rural residential usage of the Internet in Missouri

Perhaps most critical to the *MoBroadbandNow* initiative is how broadband is being used in rural areas of Missouri compared to non-rural areas. One of the ways residents measure the quality of their Internet service, is whether it has enough power to drive the applications they are using or desire using. In open-ended comments captured in the survey, several respondents indicated using Internet applications to apply for jobs, for college, take online courses, look at property maps and operate home-based businesses. These applications often were described as challenging because they did not have enough Internet capacity to run them efficiently with their current service. More than 1,600 comments were logged by respondents.

For example, Roger and Nancy Rosenberg in Greentop, Mo., retired to the "old family farm place" in the rural Northeast region after a career in the military. Once settled in, they wanted to continue working and started a small, family business dedicated to creating polo shirts with custom embroidery designs. The business has taken off, but unfortunately their Internet service has not. Currently relying on satellite supported Internet service, they report that banking, credit card processing, and moving their designs online is painfully slow and inefficient.

While there are several similarities in the way rural residents and non-rural residents use the Internet, when assessing applications used in the last seven days there are differences in economic, education, information and civic engagement (see Table 3).

Table 3: Internet use for various activities in Missouri as compared to U.S. average

Activities	Rural Missouri	Non-rural Missouri	Missouri	National Average
Keep in touch with family and friends	89%	88%	88%	--
Look for information about a service or product you are thinking of buying	86%	83%	84%	78%
Look for health or medical information	70%	68%	69%	80%
Buy something online	66%	62%	64%	71%
Look online for news or information about politics	66%	66%	66%	76%
Use an online social networking site like Facebook or LinkedIn	65%	64%	65%	64%
Do any online banking	63%	66%	64%	61%
Visit your state, region or local government's website	46%	42%	44%	67%
Watch television or other videos	40%	49%	44%	71%
Play online video games	34%	36%	35%	36%
Look online for information about a job	33%	30%	31%	56%
Take a class or do homework	24%	20%	22%	--
Work from home (telecommuting)	24%	26%	25%	--
Contribute to a website, blog or other online forum	21%	24%	22%	32%
Look for information about a place to live	20%	20%	20%	39%
Share something online that you created yourself	19%	19%	19%	30%
Operate or support a home-based business	17%	13%	15%	--
Sell something online	17%	14%	15%	15%

(Data source: *MoBroadbandNow* – Residential Survey, 2011)

Rural residents are more likely than non-rural residents to use the Internet to ***empower economic activity***. Rural residents are more likely to look online for a service or product they are thinking about buying, are likely to buy, look for information about a job, operate a home-based business and/or sell something online.

Rural residents are more likely to ***seek information*** than their non-rural counterparts. Rural Missouri residents are more likely to go online and visit a local, state or national government website to look for health and medical information. One example of rural Missourians benefitting from broadband capacities and government partnership is in the nationally recognized work of Boone County. Working with local public safety representatives, the Boone County information technology department developed an online application that identifies current road closures across the county. The online tool has become valuable to public safety

personnel as they manage best routes to take in emergency situations. The maps and information require a robust Internet connection.

Rural Missouri residents are *less likely to use their online connections for entertainment or social activities*. This is likely driven by slower connections with less capacity for video and moving larger files. For example, rural resident are not as likely to play video games online, share videos and contribute to a website or blog.

Non-Adopters: The final 12% of rural residents

Based on the residential survey, one fifth of rural Missourians reported **cost as the primary factor for not adopting the Internet** when it is available. Another 30 percent of non-adopters in rural areas do not have access to high-speed Internet.

Nearly 16 percent of rural households without an Internet connection reported they had not adopted out of concern with regard to inappropriate content on the Internet or privacy and safety concerns related to Internet use.

One fifth of rural households without Internet reported either not having the time, or use, for the Internet, or simply lacking the skills or know-how to use Internet technology, evaluate technology choices, or needed technical assistance to set it up and manage it.

As expected, there is a strong correlation between having residential Internet and household income in rural Missouri. What is really interesting is the rural / non-rural differential for each of the five income groups presented in Table 4. Rural Missouri households earning less are more likely to adopt the Internet than those in similar income categories in non-rural areas. This finding suggests that rural Missourians in lower income households place a greater value on Internet service than their more urban counterparts.

For both the middle- and high-income groups, Internet adoption is higher in non-rural areas. In the two lower-income groups Internet adoption is higher in rural Missouri by four to six percentage points.

The broadband adoption differential, however, is higher across all income categories in non-rural Missouri showing that there is a lag in adoption of higher speed capabilities in rural Missouri (see Table 4).

Table 4: Computer Internet and broadband adoption based on income groups

HH Income Group (per year)	Missouri	Rural Missourians	Non-rural Missourians	Rural / Non-Rural Adoption Differential*
Computer adoption among Missouri residents				
≥ $75,000	98%	98%	99%	-1%
$50,000 - $74,999	97%	97%	97%	0%
$30,000 - $49,999	95%	96%	94%	+2%
$10,001 - $29,999	84%	88%	82%	+6%
≤ $10,000	73%	75%	69%	+6%
Internet adoption among Missouri residents				
≥ $75,000	96%	94%	98%	- 4%
$50,000 - $74,999	92%	91%	94%	- 3%
$30,000 - $49,999	88%	87%	89%	- 2%
$10,001 - $29,999	78%	81%	75%	+ 6%
≤ $10,000	63%	65%	61%	+ 4%
Broadband adoption among Missouri residents				
≥ $75,000	82%	71%	93%	- 22%
$50,000 - $74,999	76%	67%	87%	- 20%
$30,000 - $49,999	69%	60%	81%	- 21%
$10,001 - $29,999	60%	56%	66%	- 10%
≤ $10,000	54%	49%	59%	- 10%

(Data source: *MoBroadbandNow* – Residential Survey, 2011)
 * A negative value means lower values for rural than non-rural

These survey findings also suggest that households with children are more likely to adopt Internet as compared to those without children (true for both rural and non-rural households). The rural / non-rural differential in broadband adoption for households with children is 22 percent compared to 19 percent differential for households without children (see Table 5).

Table 5: Internet adoption for households with and without children

Household Type	Missouri	Rural	Non-rural	Rural / Non-Rural Adoption Differential*
Computer adoption among Missouri residents				
With Children	97%	97%	97%	0 %
Without Children	89%	91%	88%	23%
Internet adoption among Missouri residents				
With Children	92%	91%	95%	- 4 %
Without Children	86%	86%	86%	0 %
Broadband adoption among those with Internet				
With Children	77%	68%	90%	- 22%
Without Children	68%	59%	78%	- 19%

(Data source: *MoBroadbandNow* – Residential Survey, 2011)
* Negative value means lower values for rural than non-rural

How does adoption vary across planning regions in Missouri?

Missouri has a long history of effective regional planning. Nineteen (19) regional planning commissions are organized to cover the state. Table 6 presents key facts from the residential survey relative to broadband adoption within each of these regions. The percentage of adoption and regional ranking (based on the percentage of residents that have adopted broadband) find the strongest rate of broadband adoption in regions that include major cities like St. Louis, Kansas City and Springfield.

Considerably lower adoption rates are found in rural Missouri compared to non-rural Missouri except for four regions that have marginally better adoption in rural areas than non-rural areas. These include: Bootheel, Green Hills, Northeast, and Northwest.

A handful of regions, such as the Lake of the Ozarks, East-West Gateway, Harry S Truman, Ozark Foothills, and Lake of the Ozarks have a more than 30 percent lower adoption in their rural areas as compared to their non-rural areas (see Table 6).

Table 6: Computer, Internet and broadband adoption in Missouri Regions

Regional Planning Commissions (RPC)	Computer Adoption	Internet Adoption	Broadband Adoption	Regional rank for Broadband Adoption (1=best, 19=worst)	Rural / non-rural difference in Broadband adoption*	Average cost for Internet ($/month)
Mid-America	93%	93%	88%	1	-11%	48
East-West Gateway	95%	93%	83%	2	-32%	48
Mo-Kan	91%	89%	81%	3	-13%	50
Southwest	93%	93%	80%	4	-15%	43
Northwest	89%	88%	78%	5	3%	43
Boonslick	92%	88%	77%	6	-2%	44
Mid-Missouri	95%	92%	76%	7	-21%	43
Northeast	89%	87%	76%	7	2%	43
Green Hills	87%	87%	75%	9	3%	39
Southeast	93%	89%	74%	10	-27%	43
Harry S Truman	90%	86%	73%	11	-30%	37
Bootheel	83%	80%	71%	12	1%	40
Pioneer Trails	92%	91%	69%	13	-18%	46
Mark Twain	89%	85%	66%	14	-23%	41
Meramec	92%	88%	66%	14	-21%	43
South Central Ozark	89%	84%	64%	16	-10%	44
Ozark Foothills	87%	81%	55%	17	-30%	41
Kaysinger Basin	87%	84%	54%	18	-29%	41
Lake of the Ozarks	92%	84%	48%	19	-33%	42
Missouri	**91%**	**88%**	**71%**	**-**	**-20%**	**43**

* A negative value means lower values for rural than non-rural
(Data source: *MoBroadbandNow* – Residential Survey, 2011)

The cost of Internet service is consistently reported as the most important broadband adoption characteristic for the residents of all 19 regions (more than speed or number of providers (choice). On average, Missouri households with Internet pay $43 per month for residential Internet services, with an averaged range of $13 per month or ($156 per year) between the highest-paying and lowest-paying region.

While most Missourians who have residential Internet connections are more dissatisfied with the choice of providers in their area, residents in regions where there is higher broadband adoption (Mid-America, East-West Gateway, and Southwest) expressed greater dissatisfaction with the cost of Internet, followed by their choice of providers.

Conclusion

The analysis of the *MoBroadbandNow* residential survey data finds elements of a digital divide present in Missouri. A divide exists between rural and non-rural access and adoption of broadband. The regions of the state vary in terms of broadband provider choice, average cost of Internet connection and satisfaction with their current connections. The efforts to narrow the non-rural broadband gap must continue so that the benefits of the Internet are present in these rural communities. *MoBroadbandNow* is working to capture this information, share it with key stakeholders in the broadband deployment process, and to support regional strategy planning that sets overall goals, implementation plans, and benchmarked outcomes.

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The goal is for

95 % BROADBAND AVAILIBILITY

in Missouri by the end of 2014

Broadband providers were awarded

$261 MILLION

to construct new broadband networks in Missouri.

More Than

100 INTERNET SERVICE PROVIDERS

are participating in broadband data submission.

19 REGIONAL TECHNOLOGY STRATEGIC BROADBAND PLANS

developing a broadband strategy for underserved communities.